

A COMPARATIVE ANALYSIS OF TWO SEMINAL WORKS FOR SOLO BASS
TROMBONE WITH ELECTRONIC ACCOMPANIMENT

BY

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Submitted to the graduate degree program in the School of Music and the Graduate Faculty
of the University of Kansas in partial fulfillment of the requirements for the degree of Doctor
of Musical Arts.

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Date Defended: Jan 29, 2016

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Date approved: Jan 29, 2016

Abstract

This study focuses on two early solo trombone and electronic music pieces, Edward Diemente's *Hosanna II*, and Walter Ross's *Prelude, Fugue and Big Apple*, both composed in the early 1970s. It begins with a brief history of works for trombone and electronic media to explain the musical lineage of each of the compositions. Each piece is analyzed in detail with regard to form and compositional technique; the paper also includes a comparison of the two works. An appendix includes a list of 29 works for trombone and electronic media.

Dedication

This document is dedicated to my father, Ping-Wu Chu, who passed away while I was doing this research.

Acknowledgements

It has been a long journey to complete this research. Along the way, I have received help from many people who deserve a share of the credit for this document. I would like to thank my mother, Mei-Lan Chang, my sister, Szu-Mei Chu, my brother, Chi-Ping Chu, and my cousin, Ming-Zhu Lu, for always supporting me toward my dream in so many ways.

Along with my family members, there were also a multitude of others who have supported me both financially and emotionally. These people are, in no particular order, Wen-Shing Chang, Christopher Sanchez, Steve Dillon, Judy Chen, and Mark Doyaga. In addition, I would like to express my appreciation to the composers. Edward Diemente offered firsthand information on *Hosanna II*, and the Ross family offered me a legal copy of the score and CD for *Prelude, Fugue and Big Apple*. Moreover, I would also like to thank all of my former teachers, particularly Chao-Ming Chang and Terry Shiu, who were totally unyielding in their encouraging support. Haim Avitsur and David Taylor also inspired me in the area of trombone and electronic music. John Rojak and Michael Davidson both contributed towards the repertoire that was analyzed in this document.

Most importantly, I would greatly like to express my gratitude to Bryan Kip Haaheim.

Without his comprehensive guidance and knowledge, it would have been virtually impossible to complete this work.

Finally, I would like to thank my wonderful husband, Charles Pickard. Without his unconditional love and support, I would not have been able to fulfill my dream and complete this research.

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Chapter 1

A Brief History of Electronic Music

Electronic music became an important new genre of art music in the twentieth century. Early experiments started around 1900, but the genre began to influence solo trombone composition in the 1960s. Two important categories of electronic music, *musique concrète* and *elektronische musik*, had a great impact on the first musical works for solo trombone and electronics. This study will briefly trace the history of electronic music featuring solo trombone with electronic accompaniment, focusing on two early solo trombone and electronic music pieces: Edward Diemente's *Hosanna II* and Walter Ross's *Prelude, Fugue and Big Apple*.

The history of electronic music can be traced to the American inventor Thaddeus Cahill. He invented the telharmonium, which is considered the first synthesizer, between 1896 and 1906.¹ However, it was not commercially successful due to its huge size and the fact it was not economical. The first commercially successful electronic instrument was the theremin, also known as etherophone or thereminovox, invented by

¹ Herbert A Deutsch, *Synthesis: An Introduction to the History, Theory, and Practice of Electronic Music* (New York: Hofstra University, 1976), 20.

Russian electronics designer Leon Theremin between 1920 and 1924. The instrument was very popular in the late 1920s and is still performed and used today.²

The AEG Magnetophone, a device that recorded sound to magnetic tape, was invented in Germany in 1935. In 1939, John Cage composed *Imaginary Landscapes*, which uses this tape recording device in its performance.³

Before World War II, electronic music was usually played in live performances in a manner attempting to imitate existing instruments. This usage generally was not well received by audiences and musicians of the time.⁴ However, in the 1950s the German *elektronische musik* and the French *musique concrète* were important styles that led electronic music to become accepted forms of musical expression in art music.

Musique concrète was originated by two Parisians in the early 1940s, the composer Pierre Henry and the engineer Pierre Schaeffer.⁵ French music has often focused on color, texture, and timbre change. *Musique concrète* adopted the same interest in timbre, but in the context of a recording and broadcast studio. Henry and Schaeffer recorded sounds from acoustic sources and changed them electronically. The

² "Theremin Academy," Theremin Academy, <http://theremin-academy.org/> (accessed January 23, 2016).

³ Deutsch, *Synthesis*, 23-24.

⁴ John H. Appleton and Ronald Perera, *The Development and Practice of Electronic Music* (Englewood Cliffs, NJ: Prentice-Hall, 1975), 10.

⁵ *Musique concrète* is a form of electroacoustic music that is made in part from acousmatic sound. In addition to sounds derived from musical instruments or voices, it may use other sources of sound such as electronic synthesizers or sounds recorded from nature.

source material included voices, musical instruments, and real-world sounds like trains or dripping water. Their modification techniques included sound alternation, tape splicing, filtering, and amplifier manipulation. Over the years, the composers who participated in France's state-run radio station *Radiodiffusion Francaise* (the group for research on *musique concrète*) included Olivier Messiaen, Pierre Boulez, Marcel Delannoy, Andre Jolivet, Michel Phillippot, Jean Barraque, Henri Dutilleux, Karlheinz Stockhausen, and André Hodier.⁶

The approach of *musique concrète* was quite different from German *elektronische musik*, a style practiced by Karlheinz Stockhausen at the Studio for Electronic Music in Cologne. While *musique concrète* manipulated recorded sounds on magnetic tape, *elektronische musik* style focused on music synthesized from electronically produced sounds.⁷ Stockhausen had worked in Schaeffer's studio in 1952, and in much of his work Stockhausen combines techniques of both *musique concrète* and *elektronische musik*.

In the United States, Columbia University purchased an Ampex tape recorder in 1951, and professors Vladimir Ussachevsky and Otto Leuning of the Department

⁶ Deutsch, *Synthesis*, 21.

⁷ Herbert Eimert and Karlheinz Stockhausen, *Electronic Music* (Bryn Mawr, PA: T. Presser, 1958), 1–10.

of Music started experimenting with it to produce electronic music. Their first concert was held at the Museum of Modern Art in 1952 in New York.⁸

A History of Works for Trombone and Electronic Accompaniment

Electronic music began influencing trombone music composition in the 1960s.

Douglas George Farwell identified more than 300 works for trombone and electronics including solos, duets, chamber music, and large ensembles from the years 1963-1995.⁹

In his dissertation, Thomas Burns Cox identified twenty-five compositions for trombone and electronics composed between 1963 and 2008, including eleven works not included in the Farwell dissertation.¹⁰ Cox annotated each work with composer, year, style, duration, and other useful performance information. In my own research, I have found another twenty-nine works that are not included in either Farwell's or Cox's work.

[Appendix 1 of this document contains a list of these works.]

The earliest piece for tenor trombone and electronic music was *Changes: Open Style*, written by Larry Austin in 1965. This was followed by Jacob Druckman's *Animus I*

⁸ Deutsch, *Synthesis*, 27.

⁹ Douglas George Farwell, "A Catalog of Works for Trombone and Electroacoustic Music" (DMA diss., University of Illinois at Urbana-Champaign, 1998).

¹⁰ Thomas Burns Cox, "Two Analyses and An Annotated List of Works for Solo Trombone with Electroacoustic Accompaniment for Use in The Collegiate Studio" (DMA diss., University of Georgia, 2011), 60-76.

for tenor trombone and tape in 1966-67. Although *Animus I* was not the first piece composed for trombone and electronic sound, it is the earliest work that is still widely performed. The first work specifically for bass trombone, *Big Trombone*, was composed by Philip Corner and published in 1963.¹¹

Early music of this genre was mostly abstract. The melodic lines and harmonic progressions follow the principles of the atonal or serial music popular at the time. Moreover, most of the earlier works focused on changing the tone color, creating new timbres, or using new extended performance techniques. For example, Oliveros's *Theater Piece* features unusual props, such as a hose, a candle, and funnels.¹² Trombone multiphonics are called for extensively in Corner's *Big Trombone*. Later works in the 1970s and 1980s were influenced by or contained elements from funk, jazz, and hip-hop music.¹³ For instance, Michael Davis' *Mission Red* for tenor trombone and CD (1994) and *Blackhawk* for bass trombone and CD (1995) both belong in this category.¹⁴

¹¹ Farwell, "A Catalog of Works for Trombone and Electroacoustic Music," 17-18.

¹² Stuart Dempster, *The Modern Trombone: A Definition of its Idioms* (Berkeley: University of California Press, 1979), 37.

¹³ Cox, "Two Analyses and An Annotated List of Works," 5.

¹⁴ Ibid.

Thomas G. Everett's Influence

The compositions for bass trombone examined in this paper, *Hosanna II* by Edward Diemente and *Prelude, Fugue and Big Apple* by Walter Ross, were dedicated or connected to Thomas G. Everett.¹⁵ Everett's influence in the creation of new music for the bass trombone is extraordinary. Everett is a bass trombonist and educator who has contributed greatly to bass trombone repertoire. In addition to founding the International Trombone Association, Everett commissioned a great many new compositions for bass trombone. According to Christopher J. Gassler, there are fifty-seven works for bass trombone commissioned by or composed for him from 1966 to 1989, and Everett also composed three works himself. Within these works, eighteen are unaccompanied works, six are solos with piano, six are solos with orchestra or band accompaniment, three are solos with jazz ensemble, and twenty-four of them are various forms of chamber music, including pieces with electronic sounds.¹⁶ Everett's efforts have expanded the bass trombone repertoire tremendously.

¹⁵ Christopher J. Gassler, "The contributions of Thomas G. Everett to bass trombone repertoire, literature, and research" (DMA diss., University of North Texas, 2002), 28-29, 51.

¹⁶ Ibid., 1-2.

Challenges to Performers

One of the significant challenges in bringing these works to the stage is how to play the pre-recorded audio tracks. Many of these works were realized at a time when the only option for recording and playback of the audio accompaniment was a tape recorder that used magnetized tape as its medium. The original tapes are often in poor condition, if they are available at all. In addition, it is becoming increasingly difficult to find working reel-to-reel tape machines. Modern playback generally requires a digital version that can be played from a computer, CD, DVD, or any device that can play digital audio. Helpfully, some of the works have been digitized by the publishing companies or by the composers themselves.

Chapter 2

Diemente's *Hosanna II* for Bass Trombone and Tape

Edward Diemente was born in Rhode Island in 1923. He studied at Boston University, Hartt College of Music, and the Eastman School of Music. He taught at the University of Hartford for forty years and is currently Professor Emeritus at the university. He was the director of the electronic music studio at Hartt as well as organist and music director at churches in the Hartford area. Diemente studied church music, especially early polyphonic music and Gregorian chant. His compositional style is influenced by both early music and mid-twentieth century idioms, as well as jazz.¹⁷ Diemente composed the *Hosanna II* for bass trombone and tape in 1972. It was dedicated to and premiered by Dr. Thomas G. Everett.

Formal Structure

Hosanna II can be divided into three major sections, as indicated in Table 2.1. The primary material, part A in Table 2.1, is presented during the first two minutes and

¹⁷ University of Hartford, "Edward Diemente," University of Hartford Special Collections, http://library.hartford.edu/UniversityLibraries/archspeccoll/special_collections/diemente.aspx, (accessed January 26, 2016).

twenty seconds of the piece. This section features unmuted trombone playing the main thematic materials using fragments of the 12-note chromatic aggregate. The secondary material (part B) introduces muted trombone and uses indeterminate notation that does not indicate specific rhythm or duration. The B section eventually presents complete chromatic aggregates, though the piece is not formally a 12-tone work. The final section uses elements of both A and B, including thematic materials from A and the 12-tone aggregates from B.

Table 2.1. Major divisions of *Hosanna II*.

Section	Start time	Duration	Score	
A	0'00"	2'20	beginning -p3 1st system	Trombone solo without mute and played quarter note between mm76-78
B	2'48"	1'45"	p3 2nd system - end of p4	Indeterminate section with mute
A and B	4'35"	3'24"	p5 – end	Combining the motives from section one and two as well as use of mute to change timbre.

Motives

The performance begins with electronic music, and the trombonist should begin to play as soon as he or she hears the electronic sound. The character of Part A is

defined by large intervallic leaps and repeated rhythmic patterns. The leaps are mostly major and minor sixths and sevenths, with an occasional perfect fourth. There are two important rhythmic motives: one is a sixteenth note followed by a longer note value, and the other is a triplet. The rhythmic motives always appear in combination with the leaps. For example, there are three places in Part A that begin with the sixteenth note followed by a longer note value motive, and each is a leap of a major or minor sixth. Thus, it is easy for audiences to recognize the beginning of a new phrase. The triplet rhythmic motive is more diverse in its use of intervallic leaps; this motive uses leaps of a perfect fourth, major sixth, minor sixth and major seventh.

Musical Influences

Hosanna II shows the influence of medieval chant, *musique concrète*, post-tonal techniques, and jazz. According to the composer, the title *Hosanna* is from the Roman Catholic Liturgy.¹⁸ Diemente chose as his inspiration the Hosanna text that is a small part of the Sanctus, one of the movements of the Mass Ordinary. The text and melody that he uses can be seen in Figure 2.1.¹⁹

¹⁸ Edward Diemente, email interview by author, July 25, 2013.

¹⁹ Ibid.

Sanctus

Gregorian Chant



Figure 2.1. The original chant and the text selected for use in *Hosanna II*.

Musique Concrète

The electronic audio playback is based on the singing of the Hosanna text with a chant melody. He combined the two elements, the Hosanna text and medieval chant, into an avant-garde electronic setting. The electronic techniques the composer used to manipulate recorded sounds draw from the tradition of *musique concrète*. Diemente recorded his voice and layered it multiple times, then used filters and variable speed tape recorders to modify the sound, thus changing the timbre and pitch of the recordings. In addition, Diemente created many of the electronic sounds using various tone generators, a synthesis technique more often associated with the *elektronische musik* tradition.

Set Theory Techniques and Twelve-tone Music

An analysis of the main theme (Part A) using set theory shows some interesting features. The sets of this piece have prime forms [0, 1, 3], [0, 1, 4] and [0, 1, 5]. The piece begins with the pitches A, F-sharp, and F-natural which can be labeled as $T_5[014]$.²⁰ The set [014] is used six times in the opening theme and the varied repetition of it that follows immediately (page 1 of the score). The opening section (Part A) also ends with two repetitions of the set $I_2[014]$ and $T_0[014]$. The set [015] appears prominently in the theme as well. $I_0[015]$ is first presented as the quarter-note triplet figure on the second system. $T_0[015]$ is the cadence of the main theme (bottom of page 1). The set [013] is also found in various prominent places.

Part B continues with several expressions of the set [015] but soon progresses to the use of several complete 12-note chromatic aggregates. Although he uses 12-tone aggregates, this piece is not really a 12-tone composition. The music does not use 12-tone rows in the traditional way, but it is clear that Diemente is working with complete chromatic aggregates, using various techniques to combine four- to eight-note segments of a few different note collections. The complete aggregate 1 [9, 6, 5, 0, 4, 3, 2, 1, 11, 10, 8, 7] appears for the first time in the last system of p3. The first 10 pcs of this aggregate

²⁰ In order, $T_5[014]$, $I_0[014]$ $T_5[014]$ $I_2[014]$ $I_{11}[014]$ $T_{10}[014]$.

are first heard in the opening theme but the aggregate is not completed at that time.

This aggregate also returns again at the very end (with the last note left out).

Although his technique is not the same as Schoenberg's, Diemente does use some traditional 12-tone transformations: transposition, inversion, and retrograde. Aggregate 2 [8, 10, 11, 1, 0, 2, 3, 5, 4, 6, 7, 9] appears in the first system of page 4 and is followed immediately by its retrograde. The composer then creates a 12-note sequence that contains the first four pcs of the retrograde and the last 8 pcs of Aggregate 2. The rest of page 4 contains fragments of Aggregate 2 combined with fragments from its retrograde. A significant segment [3, 4, 2, 1, 11, 0, 10] of the pitch collection created by the inversion of Aggregate 2 that starts on G# [8, 6, 5, 3, 4, 2, 1, 11, 0, 10, 9, 7] appears in the main theme on the second system of page 1 as well.

The last section functions as a recapitulation, though it is significantly varied from the exposition. It combines thematic elements from Part A and Part B. The main thematic motive of Part A is presented in inverted form. The use of mute is recalled from Part B. The composer's treatment of the twelve-tone aggregates at the end of this piece is similar to the beginning of the piece. The composer combines one completed aggregate with another incomplete one. These two collections also share some common

note patterns. Table 2.2 demonstrates how the composer uses the combined twelve-tone aggregates to end this piece.

Table 2.2. The treatment of the twelve tone rows in the last part of *Hosanna II*.

	E	F	Db	F#	G	Bb	A	F#	*F	C	E	Eb	D	Db	B	*Bb	Ab
trb.	4	5	1	6	7	10	9	6	5	0	4	3	2	1	11	10	8
Agg2	4	5	1	6	7	10	9			0		3	2		11		8
Agg1							9	6	5	0	4	3	2	1	11	10	8

Jazz Influence and Improvisation

The composer indicates that some of the freedom within *Hosanna II*, especially with time, was influenced by jazz even though it is not true jazz improvisation.²¹ The composer writes:

A dominant characteristic of jazz is improvisation. Here the performer is given a framework of the original theme, a chord progression or a mode or two. He weaves around these as if creating a variation or a freer flowing composition. What I am explaining is not the outward rhythmic characteristics of jazz but rather its PROCESS, or how it is organized.²²

The electronic music provides a framework for this piece. However, the trombonist has the freedom to interpret the music how he or she pleases in each section. This is the idea that the composer borrows from jazz.

²¹ Diemente, interview with author.

²² Ibid.

Performance Practice Considerations

This piece presents numerous challenges to the musician attempting to master it. This section will address issues of performance practice and how to face the challenges of interpreting the composer's vision.

The range of this composition is from Bb1 to G4 (with middle C equal to C4), which is playable on a single or double valve bass trombone or on a tenor trombone with the F attachment. The solo is written in free meter with no bar lines. The tempo given by the composer is a bit flexible: the quarter note equals between 76 and 78 beats per minute. The composer also uses non-traditional graphic notation. Because of this, Diemente offers instructions in the performance notes of the score and throughout the score itself, in which he explains how to read his notation and perform the piece.

In contrast to Part A, which is written with specific note values, Part B is notated with indeterminate meter and rhythm. The length of each note and each rest can be varied significantly. The composer uses a new notation system without fixed durational values. Instead of using ordinary rests, the composer uses wedges (inverted triangles ▽) to represent a rest with indeterminate length. The size of wedge determines the relative duration of each rest. (Larger triangles indicate longer durations.) Square whole notes are to be very long. Notes without stems are free in duration but usually rather short,

and those notes should be uneven in value. Notes without a stem but with a dot above are very short and also uneven. The thirty-second note connected with a stem on top but no stem in the middle should be played as fast as possible.

The relationship between the trombone and the electronic music can be a conversation or duet depending on how long the performer takes each rest. Another challenge is the use of the lamp shade mute to change the timbre. Finally, the fast note groups here might require double-tonguing. The rests between section two and section three are longer than the previous ones, which gives the performer a cue to end this section.

Synchronization with the Fixed Media

Because of the method of notation in which time is not controlled precisely with a discernible pulse, timing and synchronization with the fixed media can be a challenge. Since there are no bar lines in this piece and the quarter note tempi can vary between 76 to 78 BPM, and since the wedge notation gives freedom to the performer to choose the length for each rest, the performer must be very familiar with the electronic part to be able to judge the pacing of the performance in order to end sections appropriately. Even the start time might vary between performances a bit because the composer

indicates to “begin as soon as you hear tape sound.”²³ Since each person will react differently and begin at a slightly different moment, the composer instructs, “in indeterminate sections be inventive in response to the tape. Choose appropriate moments to play your events either in reaction or in opposition to the tape.”²⁴

Originally, the composer solved the synchronization problem by using tape leader (a non-magnetic tape of paper or plastic used in magnetic recording at the beginning or end of a reel, or as a marking for the beginning of a selection within the tape). The leader, which is usually white, is plainly visible to the performer and was used as a visual cue to subdivide the piece into three sections. However, due to the change of technology, magnetic tape is no longer in use. The problem with current technology is that digital playback devices provide the performer with no visual component or cues. The leader sections of the original tape simply become silent sections on the CD or audio file, and trombonists have to pay attention to those sections by ear only. Diemente has composed the music to be flexible in performance to accommodate timing differences in each performance. For example, in order to end this piece together with the recorded audio, he writes that the last two notes (square whole notes) can be repeated until the end of the fixed media is heard.

²³ Edward Diemente, *Hosanna II* (New York: Seesaw Music, 1972), 1.

²⁴ Ibid.

Because timing is the biggest concern in this piece and because there are no bar lines, as well as variable *tempi* and rests, synchronization is based almost entirely on familiarity with the duration of the sections by ear. One suggestion for those beginning to learn this piece is to play one element at a time. First, one might practice the three sections separately, and play each section in time. Second, one should play the first and third sections with the electronic music in order to adjust how one interprets the length of each "wedge." Finally, the trombonist should listen to the electronic music carefully and try to let the electronic music "speak" during each wedge. The most important element in performing these three sections is to end the section before each silence appears.

Timbre

The composer makes a special effort to use varying timbres. He also gives an explanation about these timbral changes in the score. For example, there are two places in which the composer specifies the use of alternate positions using the F attachment in order to change the timbre of a note without changing the pitch. Both occasions are repeated notes with a 'T.C.' (timbre change) marked above the staff in the score. By using the F attachment to play the same note, the sound produced will be from a

different overtone series. In addition, the longer tube will also affect the tone quality.

Therefore, the timbre will be changed. Diemente also gives indications such as “brassy” and “normal” tone to show contrast between the two phrases. The *glissandi* also introduce different timbres to the work.

Most of the time, trombone players only use valves for notes below F3, mainly for missing notes B1-Eb2, due to the length of the trombone tube as well as the overtone series. The other reason to use the valve is to find an easier position in which to play a passage. For example, it is easier to play Bb2 to C3 both on the first position with the C3 played with the F attachment, rather than moving the slide from the first position to the sixth position. Using the overtone series, the notes above F3 are playable in the first five positions. To use the valve to play the notes above F3 creates a change of timbre due to different overtone series and the length of the tube. Moreover, in the score the symbol “V” under a note means to use a valve, which produces the same note but as part of a different overtone series, which changes the timbre. The other way to alter the timbre is by using a special mute that Diemente requires for this piece. The composer describes it as follows:

One mute is needed. This mute is to be mounted on a stand so that the player does not hold it but directs the bell of his horn into the mute. This mute must be a light, metal photographic lamp shade, 10 ½ inches in diameter. When playing

forte or louder, it is suggested that some contact be made between bell of horn and metal mute (not continuously—be tasteful!)²⁵

It is important to take control of using the mute as well. While musicians plug most mutes into the bell, the lamp shade mute is different. The metal photographic lamp shade mute is mounted on a stand, and the player moves the bell of the trombone forward to use the mute. One must be sure to show a distinction between mute and open playing. When the score shows "open," one should make sure there is enough space between the bell and the mute so the sound will not be affected. When the score indicates "mute," players can be very close to the mute, and sometimes the bell may touch the mute to make different sounds and vibrations as the composer indicates. Finally, the fast notes might require extended skills and alternative slide position considerations.

Dynamics and Extended Techniques

Diemente notes that the whole note tied with a sixteenth note, marked with an accent and *crescendo* to *fortississimo*, as "*Crescendo* to an explosion with the breath. But do not tongue the 16th note."²⁶ The other important characteristic in Part A is the use of dynamic changes, which are intended to be dramatic. The performer must change the

²⁵ Ibid.

²⁶ Ibid.

dynamic level every few notes. The piece requires extreme dynamic contrasts, from *fortississimo* to *pianississimo*. In addition, the change of intervals are also dramatic.

These two elements are combined frequently. The only extended technique featured is the flutter tone with *crescendo* in the last section of the piece.

Chapter 3

***Prelude, Fugue and Big Apple* for Bass Trombone and Electronic Tape by Walter Ross**

Walter Ross was born in Lincoln, Nebraska in 1936. While studying at the University of Nebraska, he changed his major from engineering to music and was awarded a bachelor's degree in 1960 and a Masters of Music in 1962, followed by a Doctorate of Music from Cornell University in 1966.²⁷ He studied composition with Robert Beadell, Robert Palmer and Karel Husa. In 1965, he received an Organization of American States Fellowship to study with Alberto Ginastera at the Instituto Torcuato di Tella in Buenos Aires, Argentina.²⁸

Ross has composed several concertos, including ones for oboe and harp, bassoon, clarinet, piano, flute and guitar, trombone, tuba, double bass, cello, and violin. He has received many awards, commissions, and fellowships, including an award from the National Endowment of the Arts in the summer of 1965, the Sesquicentennial Fellowship from the University of Virginia Center of Advanced Studies in 1971 and

²⁷ Walter Ross, "Walter Ross Biographical Information," Walter Ross, <http://people.virginia.edu/~wbr/biography.html> (accessed December 25, 2013).

²⁸ Ibid.

1972, an artist residency at the MacDowell Colony, and a Fellowship from the Organization of American States.²⁹

After the concerto no. 1 for tenor trombone was written in 1970, a number of bass trombonists asked Ross for a work specifically for bass trombone. The result was *Prelude, Fugue and Big Apple*, composed in September 1972. For this piece he used the same compositional techniques as his other pieces for solo instrument and tape. He described the ideas in the score:

The idea of Prelude and Fugue is very old, but it somehow seemed incomplete to me, and I decided to “complete” the idea with a dance. I searched for several months and finally found a woman in her 50’s who remembered the Big Apple dance and demonstrated it to me. After her demonstration I finished the composition in one week in September, 1972. The Prelude is aggressive and comic, while the Fugue is more contemplative. The Big Apple is a practice session for the trombonist as he tries out a few “licks” (the next-to-last is a version of the fugue subject) until the final form of the dance which finishes the movement.³⁰

On the title page of the original manuscript was the inscription “For Thomas Everett.” Everett was a bass trombonist and a music professor at Harvard University; however, he was not able to perform when the piece was completed, and Ross deleted the reference in the 1977 published score. The premiere was performed by John Marcellus, who was the professor of trombone at the Eastman School of Music.³¹

²⁹ Ibid.

³⁰ Walter Ross, *Prelude, Fugue and Big Apple* (New York: Boosey & Hawkes, 1977), 3.

³¹ Gassler, “The Contributions Of Thomas G. Everett,” 29.

Although this piece was requested by bass trombonists and composed for bass trombone and electronic tape, the best-known recording was made by tenor trombone player Per Brevig, the former principal trombonist of the Metropolitan Opera.³² Based on the range of this piece, Bb1-Bb4, it is not surprising that it fits well for both tenor and bass trombone players.

Ross created a unique three-line system to notate the music. The middle part is a time line that uses hash marks to indicate the flow of time; each mark represents one second. The area above the time line is the graphic notation for the electronic music. Different graphic symbols represent different timbres and electronic textures. Pitch (frequency) is represented on a vertical axis: higher pitches are notated above lower pitches. Below the time line is a traditional staff line for the solo bass trombone.

Although it is written on the traditional staff, the meaning of the note values is modified slightly. The notes only represent the relative length, not fixed values. No barlines are used. Ross provides a page of instructions for this unique notation system, and an example is reproduced in Figure 3.1. For timbral variety two mutes, a harmon mute and a bucket mute, are required for this piece.

³² Ibid.

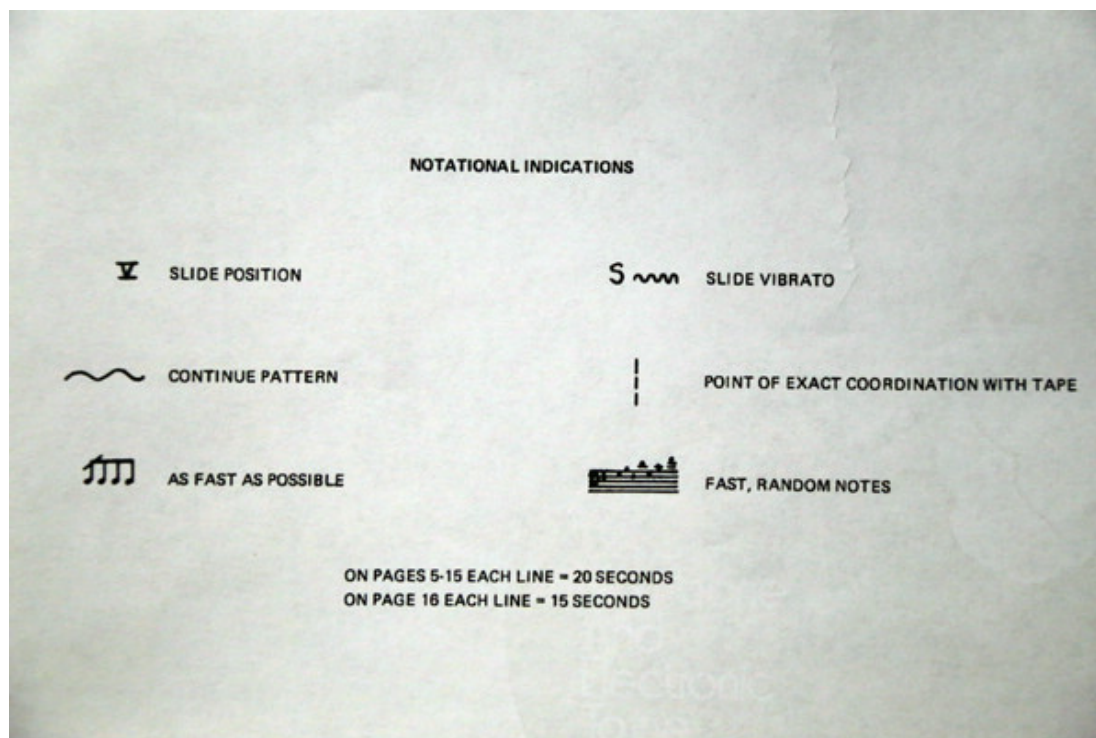


Figure 3.1. The notational indications from page 4 of *Prelude, Fugue and Big Apple*.³³

This work was composed using post-tonal techniques being used in *elektronische musik* at the time. The electronic sounds in Ross's composition were made by synthesizers at the University of Virginia Electronic Music Studio, using a variety of analog synthesis techniques that were available in the early 1970s.

³³ Ross, *Prelude, Fugue and Big Apple*, 4.

I – Prelude

The Prelude can be subdivided into three sections: Part I is for trombone solo, Part II is for electronic music alone, and Part III is again for trombone solo. All three parts share pitch and motivic material, but these are developed as fragments—there is no sense of repeated themes.

The opening trombone solo divides nicely into an A - B - B structure. The trombone and the electronic music share material briefly at the beginning of Part II, but the trombone quickly fades out, leaving the electronics to continue alone. Part II has a binary structure: A - B. In the final section, the trombone music continuously develops the main motive of the piece. Although the final section uses the basic motive, there is not a clear sense of a return to earlier thematic material.

The most fundamental pitch materials of this piece involve two pairs of semitones that are separated by an interval. This results in a group of inversionally symmetrical sets [0, 1, 3, 4], [0, 1, 4, 5], [0, 1, 5, 6], and [0, 1, 6, 7]. Ross also uses the set [0, 2, 3, 5], which is still symmetrical but contains only one semitone. At the beginning, the trombone plays two examples of the basic motive, both made from the set [0, 1, 6, 7]. Even though the interval separating the pairs of semitones changes, the melodic

semitone is always clearly audible. There is very little exact repetition as the motive is constantly varied throughout.



Figure 3.2. Example showing the semitone sets in Ross's *Prelude*.³⁴

To transition into Part II, there are five *glissandi*. Each one has a different dynamic marking, changing from *ff*, *mf*, *p*, *pp*, to finally moving the slide without sound. Part II is entirely electronic (once the trombone fades out after a the glissandi are completed), but the music continues to feature the melodic semitones. Most of the electronic sounds that the composer features in this work are introduced in this section. The composer continues to use this timbral palette in both of the other movements.

The composer always gives cues to the performer so that the player will be prepared for the next entrance. The most difficult entrance is for the electronic music in the third system, in that the electronic music has to align with the trombone. The best way to coordinate this is for the trombonist to cue the person starting the audio

³⁴ Ibid., 5.

playback. Before the trombonist's entrance in Part III, there is a clear musical cue in the audio playback for which the performer must listen. Once the trombone takes over in the final section, the audio playback is stopped until the next movement.

II - Fugue

While the prelude begins with a cadenza-like trombone solo, the fugue starts with electronic music that establishes a clear tempo. An important element here is to use a harmon mute to change the timbres. In the score, the dots between the "+" (closed) and "o" (open) are an indication of how long the opening and closing of the mute should take. It is very important to know how quickly (or slowly) the left hand should move to change the timbre of the notes.

The First Exposition

The first subject is stated by a synthesizer voice starting on D. The answer uses a second synthesizer timbre and begins with Bb. The trombone then plays the subject starting on F. After stating the subject the trombone plays the pitches of the subject in retrograde transposed up one semitone (see Figure 3.3).



fugue subject

pitched in retrograde up 1 semitone

Figure 3.3. The trombone subject and its retrograde.³⁵

The Second Exposition

The second exposition starts with a synthesizer again playing the fugue subject on a pitch between E and Eb.³⁶ The first answer begins on the pitch A and uses a bass synthesizer sound that resembles a pitched drum. The second answer again uses the same pitched-drum sound and begins on F. The trombone plays the next entrance entering on the pitch E. Again, after playing the fugue subject the trombone part reiterates the notes of the subject, this time the intervals are inverted and transposed down four semitones.

³⁵ Ibid., 8.

³⁶ The intonation of the synthesizer parts are not always precisely in tune with the equal-tempered chromatic scale based on A = 440 hertz.

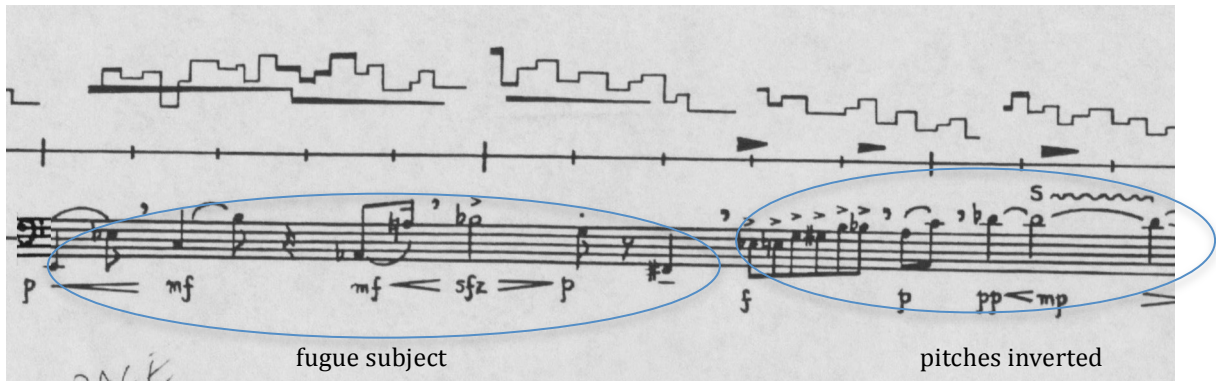


Figure 3.4. The trombone subject and its inversion.³⁷

The Episode

Just like a typical Baroque fugue, the episode contains fragments of the subject and its inversion in the trombone part. As expected there is no clear version of the subject played by either the electronic music part or the trombone part. The trombone also develops the non-subject material of the exposition.

The Third Exposition

As one would expect, the last exposition uses various techniques to manipulate the fugue subject to build the climax. The third exposition begins with the subject played by the trombone (on G) and is augmented so that the subject length is stretched. The answer by a synthesizer voice is also augmented and begins on Bb. In counterpoint to the answer, the trombone plays an incomplete inversion of the subject which starts

³⁷ Ross, *Prelude, Fugue and Big Apple*, 9.

with F# (transposed down one semitone) followed by a retrograde that begins on E (transposed down three semitones).

The composer then uses the stretto technique in various ways so that the subjects overlap from this point until the end. In most cases the subject is not complete. The first stretto takes place just one second after the first answer. The second entrance begins on C. The third entrance begins on the note B. The fourth entrance is played by the trombone beginning on Bb, overlapping both the second and the third entrances. Before the end of the fourth entrance, the fifth entrance, again using a synthesizer voice, begins directly after the end of the third entrance on a note between F and F#.

Coda

The last section features ascending motion on both the trombone and synthesizer parts. The coda section does not clearly evoke the fugue subject and has no clear cadence. It seems as if the music rises higher and higher until it finally disappears.

III - Big Apple

As the composer states in the quote found earlier in this paper, the final movement represents a practice session for the trombonist to learn and master a dance. The music reflects this idea by beginning tentatively and gaining in confidence as the

music gets harder and harder. The dance that the title refers to was called the Big Apple and originated in the American South in the 1930s. (It is not a reference to New York City.) The main connection to the dance is the use of swing rhythm.

Big Apple is a continuous variation-like movement that develops a few short motives extensively. The most common motive is made of two ascending or descending semitones (see Figure 3.5). This figure recurs at least thirty times in various ways through the movement. Another important motive is pictured on the following page in Figure 3.6. Both motives have a distinct, syncopated jazz rhythm. In this movement, as in the other two, the composer continues to focus on half step motions followed by leaps. In addition, the pitch materials for the trombone are similar to the ones used in the Prelude, using the symmetrical sets [0, 1, 3, 4], [0, 1, 4, 5], [0, 1, 5, 6], and [0, 1, 6, 7]. In differentiating this movement from the others, the composer uses a new set of pitches, [0, 2, 3, 5], several times at the beginning and ending of the movement.

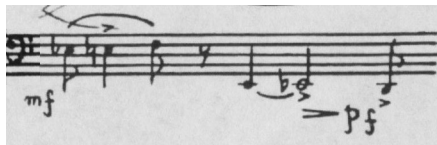


Figure 3.5. The motive of two ascending or descending semitones in *Big Apple*.³⁸

³⁸ Ibid., 12.

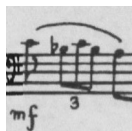


Figure 3.6. The motive of eighth note followed by triplet.³⁹

Form

Big Apple can be divided into five sections, and each section is one page in the score. The introduction features an electronic percussion sound that is used consistently in every section. Each section, except the last, ends with a 15-20 second electronic interlude. After the first section, each section begins with a few seconds of the electronic percussion sound to cue the trombonist. Within each section, the phrasing of the trombone line determines the form.

Section 1

Section 1 is to be played in the swing style and can be subdivided into two parts. The first phrase is very short: it contains only four notes. Although the phrase simply consists of four F's, it gives the audience some important elements of this movement: syncopated accents on upbeats and the swing style. The second part of Section 1 is a much longer phrase that introduces both motives 1 and 2. Section 1 ends with two iterations of motive 1; the first is ascending, and the second is descending. The electronic interlude finishes Section 1 with a texture that recalls the fugue of the

³⁹ Ibid.

previous movement, but does not actually use the fugue subject. The end of the interlude overlaps with the beginning of the second section.

Section 2

Section 2 is still in the swing style and can again be subdivided into two parts based on the phrasing of the trombone. In this case each phrase is roughly equal in length. The beginning includes two seconds of electronic percussion as a cue. Section 2 develops all the elements from Section 1 and adds two more elements, *glissandi* and slide vibrato. In addition, there is much less space because there are fewer rests. Again the section ends with an electronic interlude of about 15 seconds. Once more, the end of this interlude overlaps with the beginning of the next section.

Section 3

After four seconds of electronic percussion to cue the trombonist, Section 3 begins. It is also in the swing style and can be subdivided into two parts based on the trombone phrases. The length of the two parts in this section is like an inversion of Section 1, in that the second part is much shorter than the first part. As before, the section ends with an electronic interlude of about 15 seconds. Unlike the preceding sections, this interlude concludes before Section 4 begins.

Section 4

Section 4 also begins with a cue of two seconds of electronic percussion. This section can be subdivided into two parts; like Section 2, the parts are roughly equal in length. Both parts of this section use recognizable variations of the fugue subject and its retrograde. There are also “improvisatory” interjections interpolated into the fugue subject. To further contrast Section 4 from the other sections, there is no swing rhythm, and the music is played with a more dramatic style. Additionally, a bucket mute is required to differentiate the timbre of the trombone. The electronic interlude at the end of this section is similar to the interlude in Section 1 in terms of timbre and texture. This electronic interlude does not overlap with the beginning of the final section.

Section 5

The last section returns to the swing style, and the trombonist plays the most complete and developed version of the "dance." As with all the other sections, there are four seconds of electronic percussion in the beginning. Unlike the other preceding sections, there is only one phrase in Section 5. The trombone plays a long, continuous line that develops the two motives of the movement most extensively. The composer includes more notes in each second of time, and as a result it sounds much faster and more energetic than the previous sections. This section also uses a wider range of the

trombone. The composer uses all the elements from previous sections (except Section 4) in this part. The climax of this movement occurs at the end and requires the trombone player to jump between three octaves. Because of the last two repetitions of motive 1 beginning on F, the final Bb sounds like a clear tonic in an otherwise tonally ambiguous piece.

Chapter 4

Compare and Contrast

After carefully analyzing Edward Diemente's *Hosanna II* and Ross's *Prelude, Fugue and Big Apple*, there are many similarities and differences. In addition, there are many challenges and issues in performing and preserving this kind of music.

Diemente's *Hosanna II* was composed in 1972, and Ross composed his *Prelude, Fugue and Big Apple* in 1973. Both works belong to the electronic music genre. However, due to the different use of electronic devices to create the electronic music, *Hosanna II* may be considered to belong more specifically to the genre of *musique concrète*.

Diemente used recordings of real-world sound and manipulated it to change its timbres and pitches.⁴⁰ *Prelude, Fugue and Big Apple* belongs solely to the *elektronische musik* genre—no audio samples were used. Instead, the electronic sounds used in it were created using synthesizers.

These two pieces are both atonal, and both composers used various post-tonal techniques in their compositions. However, there are distinct differences between their two approaches. Diemente used chromatic aggregates in *Hosanna II*, while there is no

⁴⁰ Diemente, interview by author.

systematic chromatic process in Ross's *Prelude, Fugue and Big Apple*. Both composers used pitch class sets to expose the listener to frequent repetitions of certain intervals. Diemente used sets [0, 1, 3], [0, 1, 4], and [0, 1, 5] to create three chromatic aggregates and one of its retrograde, while Ross's sets focus on half step and leaping motions inherent in the symmetrical tetrachords he used.

Both pieces can be divided into three sections. Diemente's *Hosanna II* is in one movement with three major sections, A – B – AB, while Ross's *Prelude, Fugue and Big Apple* has three independent movements.

Originally, both pieces were dedicated to Dr. Thomas G. Everett, and Everett did premiere the *Hosanna II*. However, because he was not able to perform Ross's *Prelude, Fugue and Big Apple* when the piece was composed, the composer erased the dedication when it was published.

Both pieces use non-traditional notation. *Hosanna II* has no bar lines in the trombone part, and there is no indication of the electronic music in the score. In addition, Diemente uses different sizes of wedges to represent different length of rests. Contrastingly, Ross's non-traditional notation shows all the elements in the score—electronic music, time line, and trombone part. As in Diemente's score, there are no bar lines. The note values only represent their length within each second and not their

traditional durations determined by an underlying pulse at a given tempo. The graphic notation of the electronic music in Ross's score represents the electronic sounds clearly.

Both pieces utilize a similar trombone range. *Hosanna II*'s range is from Bb1 to G4, while the range of *Prelude, Fugue and Big Apple* is from Bb1 to Bb4. Both pieces are playable on a tenor trombone with the F attachment or a double-valve bass trombone.

There is evidence of jazz influence in both pieces. Neither composition is actually jazz music, but both pieces use it as inspiration. In Diemente's *Hosanna II*, the composer uses electronic music as the framework, and trombonists have the freedom to interpret the music in each section similarly to a jazz player interpreting a lead sheet. The Big Apple movement of Ross's *Prelude, Fugue and Big Apple* is clearly inspired by the jazz dance of the same name and utilizes the jazz element of swing.

The synchronization between the trombone player and the recorded media is handled quite differently in these two compositions. Originally, Diemente's *Hosanna II* physically was divided into three sections by leader tape spliced between the musical sections on the tape. This gave the player a visual cue to know where they were in time. Since the playback is now done with a digital audio file, the leader cues are no longer viable. Also, there is no indication of the electronic music in the score to aid the performer. Therefore, the musician needs to be aurally familiar with the electronic

music in order to be able to synchronize each section. Diemente includes various gestures that can be repeated as needed in order to stay in synch with the music. In contrast, Ross gives a clear time line that allows the trombone player to synchronize with the electronic music within each second. Ross also notates the electronic part graphically in a way that is very easy to follow.

A lamp shade mute is required for Diemente's *Hosanna II*, which cannot be purchased in any music store and has to be custom-made. Ross uses a harmon mute in the Fugue movement and bucket mute in the Big Apple movement. Both are standard mutes.

There are many challenges in preparing and performing music for solo trombone and electronics from this early period of electronic music. There are more than three hundred pieces of this genre listed in Farwell's 1998 dissertation, and many others have been composed since then.⁴¹ However, to secure works of this type can be problematic as many are self-published and difficult to find, and some were in limited release or are currently out of print. Some may be unavailable due to technological advances that make older technology obsolete. Many pieces were composed using magnetic tape format for the audio media. If they are not converted into new formats such as CD, MP3,

⁴¹ Farwell, "A Catalogue of Works for Trombone and Electroacoustic Music."

or MP4, it will be very difficult to perform this kind of music. In addition, the process of transferring the music into different formats may influence how they are performed.

Performers must adapt to these changes in order to perform the music.

Custom-made accessories may also create difficulties. For example, Diemente's *Hosanna II* requires a lamp shade mute made from a photographic light reflector. Even though the composer has described the shape of the mute in the music, it is still hard to recreate it since there is no image of this mute accompanying the score.

Additionally, the non-traditional notation presents challenges for performers. For example, both *Hosanna II* and *Prelude, Fugue and Big Apple* use staves without bar lines. They both offer flexibilities that allow performers to decide the length of the notes and rests. However, the trombone phrases in *Hosanna II* are to be completed within a time frame of 2:20, 1:45, and 3:40, so the synchronization is very imprecise. *Prelude, Fugue and Big Apple* indicates the flow of time in a more precise way, in increments of individual seconds of time. These flexibilities may create uncertainty when playing these kinds of works.

This research attempts to help audiences and performers connect with this kind of music by demonstrating the compositional variety and the foundation of the music. The set theory analysis shows the compositional techniques and relationships between

the intervals and musical lines. In addition, this study explores the formal relationships between the trombone solo part and electronic music. Moreover, it will help audiences understand how to appreciate this kind of music by exposing them to the unique timbral character of this music. The goal of this analysis is to attract more people to listen, to learn, to understand, and to play this unique music. It is hoped that this research will help to popularize and preserve this early repertoire for solo trombone and electronic music.

Appendix

YEAR	COMPOSER	TITLE	Alto (A) Tenor (T) Bass (B)
1977	Rzewski, Frederic	<i>Moonrise With Memories</i>	B
1991	Hillborg, Anders	<i>U-Tangia-Na</i>	A
1994	Korte, Karl	<i>Evocation & Dance</i>	T/B
1997	Davis, Michael	<i>Eagles Landing</i>	T+B
1999	Lindberg, Christian	<i>Bombay Bay Barracuda</i>	T
2000	Tsabari, Eldad	<i>Benedicio juez de la Verdad</i>	T
2000	Tsabari, Eldad	<i>The New Kid on the Mountain</i>	T
2001	Tcimpidis, David	<i>A Night Out</i> for trombone and tape	T
2001	Russell, Richard	<i>Balance</i> for trombone and tape	T
2001	Cuckson, Robert	<i>Eshel Yehuda</i> for trombone and tape	T
2001	Berger, Jonathan	<i>Haiku</i> for trombone and computer	T
2002	Chao, Ching-Wen	<i>The Captured Shadow</i> for tenor trombone, delay and pre-recorded sounds	T
2002	Russell, Richard	<i>Design for Lightning</i> for trombone and electronics	T
2002	Hurst, Derek	<i>La Belle Captive</i> for trombone and electronic sound	T
2003	Eddy Koopman (Giroloma Frescobaldi)	Canzone	B
2004	Colgrass, Michael	<i>Mystic with a Credit Card</i>	T
2004	Tcimpidis, David	<i>Night and Dreams</i>	T
2005	Kobayashi, Kyoko	<i>Colors</i> for trombone and electronic sound	T
2005	Swendsen, Peter V	<i>Winter Exhalations</i>	T
2006	Burtner, Matthew	<i>Aes/Aer</i> for Trombone and computer sound	T
2010	Plante, Michael	<i>Skyhous</i>	T
2010	Stein, Julian	<i>Solos</i>	T
2010	Pinsonneault, Michael	<i>The Brass Chameleon (Path to Inspiration)</i>	T
2010	Lippold, Ivo Tobin	<i>Ritual Summoning</i>	T
2010	Krajic, David	<i>1492.1</i>	T

2010	Tsabary, Eldad	<i>Tikkun</i>	T
2010	Cascone, Kim	<i>Sonus Aurea</i>	T
2011	Nelson, Larry	<i>Ghosts of Sackbut</i> for trombone and audio processing	T
2015	Croson, James	<i>We Interrupt This Breaking News</i> for trombone and audio	T

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